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Women's views, adherence and experience with postnatal thromboprophylaxis

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Abstract

Introduction

Based on current guidelines, many women qualify for postnatal thromboprophylaxis following childbirth, however, little information exists on how adherent women are and their experiences to both pharmacological and mechanical forms of thromboprophylaxis.

Materials and Methods

Women requiring postnatal thromboprophylaxis were given questionnaire packs exploring their beliefs about enoxaparin, anti-embolic stockings (AES) and intermittent pneumatic compression devices (IPCD). Women were also asked to complete a diary recording when doses of enoxaparin were injected, along with an estimation of the number of hours the AES were worn each day, if at all. Results were entered onto SPSS and analysed.

Results

Sixty-seven women completed the questionnaire packs. Adherence to enoxaparin therapy was relatively high (82.4%). Women self-reported sub-optimal adherence levels to the AES, with 24% stating they never wore them once home. Reasons for this included being mobile, feeling hot and feeling as if they were cutting circulation off in the legs. Women reported a high level of acceptance of IPCD post caesarean section and would be happy for IPCD to be applied again in future deliveries, if required.

Conclusions

Although many women are adherent to postnatal TP, our findings suggest that adherence to AES is sub-optimal following discharge from hospital and therefore their usefulness is questionable. Front-line clinical staff should discuss the importance of adherence to postnatal TP, in order to avert preventable venous thromboembolic events.

Highlights

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- Adherence to postnatal thromboprophylaxis has been reported to be variable
- Women's adherence to mechanical and pharmacological thromboprophylaxis was explored
- Adherence to enoxaparin therapy was relatively high (82.4%).
- Adherence to stockings was low, with 24% of women stating they never wore them once home
- Counsel women on the important role of thromboprophylaxis in preventing VTE

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Introduction

The gravid state and the postpartum period is known to increase the risk of venous thromboembolism (VTE). It is estimated that the relative risk of VTE increases by 5-fold during pregnancy, rising to as much as 60-fold during the puerperium [1]. Guidelines from America, Australia and New Zealand, Canada, Sweden and the United Kingdom all recommend risk assessment of women and prescribing of appropriate thromboprophylaxis (TP) in women identified at risk during this period [2-6], although they make differing recommendations on who should receive thromboprophylaxis postpartum. Clinicians charged with providing care for women during the postpartum period have to balance the risk of bleeding with that of thrombosis, when considering low molecular weight heparin (LMWH) therapy, with real consideration for the use of mechanical forms of TP (anti-embolic stockings (AES) or intermittent pneumatic compression devices (IPCD)) complementing pharmacological TP or when pharmacological TP is contra-indicated.

The current Royal College of Obstetricians and Gynaecologists (RCOG) guidelines for the prevention of postpartum VTE suggests a score-based system in deciding which women should be prescribed postnatal TP and for how long [4]. Although there has been recent debate about the role of TP in this population and whether we are over thromboprophylaxing patients [7-9], particularly in light of the updated RCOG guidelines in 2015, our own work at King's suggests that the number of women qualifying for postnatal TP is similar using the criteria from RCOG 2009 and 2015 [10].

When considering the different forms of TP offered to women, they might be considered cumbersome from the patient perspective; LMWH due to its parenteral nature, AES due to perceived discomfort and IPCD due to the restriction it imposes on mobility. Little information has been published in the literature on what women's views and experiences of postnatal thromboprophylaxis are and whether they actually adhere to what is recommended to them, particularly once discharged from hospital. The reports that do exist, suggest that adherence to postnatal TP is variable [11-12]. Indeed, Patel and colleagues work suggests in comparison to the antenatal period, postnatal adherence to LMWH is sub-optimal in some women, possibly due to their *routine* being disrupted by the new-born, and a perceived decrease in necessity, relative to the antenatal period [11].

The aim of this study was to explore women's views, experiences and adherence to postnatal thromboprophylaxis.

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Materials and methods

Study setting and recruitment

This study saw collaboration between the departments of haematology and women's health at King's College Hospital (KCH). KCH is a 1000 bedded London teaching hospital based in South East London, providing tertiary care for cardiology, neurology, haematology and liver specialities. The hospital is densely populated inner-city area with a skew in the population towards lower socioeconomic status. The women's health department has approximately 5000 deliveries per annum. The study was part of a larger parent study, evaluating the impact of mode of delivery and thromboprophylaxis on rotational thromboelastometry and thrombin generation in women with postpartum risk factors for VTE (paper under review). Women who took part in the parent study, were also invited to take part in this study.

Participants

Pregnant women were recruited from antenatal clinics where there was a clear indication for postnatal thromboprophylaxis, from pre-assessment clinics prior to planned caesarean section and, women admitted to the labour ward. The inclusion criteria were women aged over 18 years with planned hospital delivery. Exclusion criteria were inability to provide informed consent, antenatal thromboprophylaxis or long-term anticoagulation, inability to return to follow-up, non-local residence, no indication for postpartum thromboprophylaxis or a contraindication to LMWH, AES or IPCD.

Women were prescribed weight-based enoxaparin thromboprophylaxis on the basis of their postpartum VTE risk assessment for 7 days or 6 weeks. VTE risk assessment was based on the RCOG guidelines for VTE prophylaxis [13]. Women delivering by caesarean section (CS) had IPCD (Covidien, Hampshire, UK) applied whilst in theatre and until mobile on the ward, in addition to thigh length AES (Covidien, Hampshire, UK). AES were provided to all women at high risk of VTE to continue for the same duration as enoxaparin based on VTE risk assessment. Following delivery, and prior to hospital discharge all participants were given a questionnaire pack, depending on if they had a vaginal delivery (VD) (questionnaires 1 and 2) or a CS (questionnaires 1, 2 and 3). Questionnaire 1 was based on the beliefs about medication questionnaire (BMQ) [14], exploring women's beliefs on enoxaparin and AES, questionnaire 2 explored women's experiences and views on the use of AES and their understanding

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of VTE; and questionnaire 3 explored women's experience of IPCDs (see online supplementary information 2-4 for copies of the questionnaires).

The BMQ was chosen as it assesses beliefs regarding medication on 4 subscales; general harm and general overuse explore beliefs surrounding medication in general. Specific necessity determines the extent the patient recognises the need for a specific therapy, while the specific concern subscale determines how strong their anxieties towards a specific therapy are (in this case being enoxaparin and then adapted to assess AES). Subscales for general harm and overuse (based on 4 items each) could have a minimum score of 4 and a maximum score of 20. Scales for specific necessity and concerns could have a minimum score of 5 and a maximum score of 25. Internal consistency of the subscales for questionnaire 1 was evaluated using Cronbach alpha. The Cronbach alpha for enoxaparin for the general harm subscale was 0.7, for general overuse it was 0.8, and for the necessity and concerns subscales were both 0.7. The Cronbach's alpha for the necessity and concerns subscales for AES were 0.8 and 0.7, respectively. All sub-scales demonstrated reliable internal consistency [15]. The BMQ was considered an appropriate tool to utilise for this study, as it has previously been used in the gravid setting with enoxaparin, exploring whether women's beliefs relate to their adherence to enoxaparin [11]. For interested readers, other examples of how the BMQ has previously been used to explore the relationship between beliefs and medication adherence are listed here [16-17].

Women were asked to return the completed questionnaire pack at one of their follow up appointments, and were reminded to bring completed questionnaires back by phone prior to their follow-up appointments.

Additionally, all participants were given a diary to record the exact dates and times they took their enoxaparin injections, as well as their use of AES, including an estimate of number of hours worn each day. This diary was returned at the same time as the questionnaire pack, at a follow-up appointment, once TP had ceased at either day 7 postpartum or day 42 postpartum. Participants were assured that their responses would not be made available to their treating physician or midwife.

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Analysis

Data from the questionnaires was coded and entered into SPSS (version 23, IBM SPSS, Chicago, IL, USA). Continuous variables are given as means and standard deviations (SD) or median and interquartile range (IQR) for normal and non-normal data, respectively.

For questionnaire 1, sub-scale scores for overuse, harm, necessity and concerns were calculated, as outlined previously. Differences in subscale scores between the mode of delivery, length of TP prescribed and ethnicity were investigated. Furthermore, a necessity-concerns differential was calculated [18] for the cohort, and then separately for the subgroups and compared. This differential calculates the difference between the patients' perceived necessity for treatment and their concerns, with a positive differential score associated with the patients' intention to adhere to treatment.

Fisher's exact test was employed to compare nominal data between groups.

For questionnaires 2 and 3, percentage agreement (when participants responded 'agree' or 'strongly agree') with each statement are presented.

For the purposes of analysis, non-adherence to pharmacological prophylaxis was defined as $\geq$1 dose of enoxaparin missed.

Ethical approval

The study was approved by the London Riverside Research Ethics Committee and King's College Hospital NHS Foundation Trust Research and Development department. All participants provided informed written consent prior to data collection.

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Results

Ninety-nine participants consented to take part in the parent study and were given diaries and the questionnaire pack to complete, of which 67 women completed questionnaire 1 (68% response rate), 45 women completed questionnaire 2 (45% response rate) and 30 women completed questionnaire 3 (69% response rate). Supplementary table 1 described the details of the 99 women who took part in the larger parent study. Table 1 outlines the details of the 67 women who returned questionnaire 1. The women who returned completed questionnaires mirror the women who took part in the parent study.

Table 1: Characteristics of the 67 women who completed questionnaire 1

Characteristic	
Mean age (SD)	36.2 (4.4)
Mode of delivery, n (%)	
Vaginal	21 (31.3)
Caesarean Section	46 (68.7)
Ethnicity, n (%)	
Caucasian	49 (73.1)
African-Caribbean	16 (23.9)
Other	2 (3.0)
Mean BMI, kg/m^2 (SD)	28.5 (7.0)
Median postpartum risk factors, n (IQR)	3 (2-4)
Planned enoxaparin duration, n (%)	
7 days	50 (74.6)
6 weeks	17 (25.4)

SD Standard deviation, IQR Interquartile range

Self-reported adherence to enoxaparin and AES

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Fifty-one women returned completed diaries of self-reported adherence to enoxaparin and AES. The number of women reporting no more than 1 missed dose was 82.4%. When split into duration of enoxaparin (7 days or 6 weeks), the adherence dropped to under half with the longer duration of treatment, with more missed doses, though not significantly different (p=0.1).

The documented self-administration dates and times were reviewed in the diaries and 40% did not take the enoxaparin within 2 hours of the prescribed time. Additionally, participants had been asked to document the site of enoxaparin injections with 96% of doses self-administered the injections in the trunk region.

In relation to wearing the AES as directed (same duration as the LMWH), 69% of respondents wore the stockings up to day 5 at home, with only 32% wearing them for more than 12 hours a day, and 24% not wearing them at all post discharge.

Women's beliefs about the enoxaparin

Of the 67 completed questionnaires returned, 46 were from women in the CS delivery group and 21 from VD group. The women's responses to the four sub-scales within the BMQ are outlined in table 2. In general, the perception of harm and overuse appeared to be low in this group.

There were no differences found when comparing the total harm and overuse sub-scale scores with mode of delivery, duration of thromboprophylaxis, or ethnicity (data not shown).

Table 2: BMQ Enoxaparin

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Subscale	Mean (SD)	VD Mean (SD)	CS Mean (SD)	7-day enoxaparin	6-week enoxaparin
Total Harm	7.5 (2.4)	7.8 (2.5)	7.3 (2.4)	7.3 (2.5)	7.9 (2.2)
Total Overuse	9.8 (3.6)	10.6 (3.2)	9.4 (3.7)	9.3 (3.5)	11.0 (3.8)
Total Necessity	11.5 (2.9)	11.5 (2.3)	11.5 (3.2)	11.2 (3.1)	12.4 (2.3)
Total Concerns	10.3 (3.1)	10.5 (3.1)	10.3 (3.2)	9.9 (2.9)	11.7 (3.5)
Necessity-Concerns Differential	1.18	1	1.2	1.3	0.7

Means and standard deviations (SD) for each subscale, and by mode of delivery (VD- vaginal delivery; CS- caesarean section), and length of enoxaparin thromboprophylaxis prescribed

The Necessity-Concerns Differential (NCD) was found to be 1.18 for the cohort as a whole, with the positive differential suggesting that the participants feeling that the necessity of the enoxaparin was greater than any concerns they may have held and an intention to adhere to the enoxaparin.

When comparing mode of delivery and ethnicity sub-groups there were no differences found. However, when the NCD was calculated for each sub-group, VD had a lower NCD (1) compared to CS (1.2).

Participants were prescribed either 7 days or 6 weeks of postpartum thromboprophylaxis of enoxaparin and AES, depending on their VTE risk. Most of the participants were prescribed a 7-day course of enoxaparin and AES (76%). When comparing total necessity and concerns between these two groups, there were no differences in necessity scores. However, total concerns were higher in the 6-week enoxaparin group (mean [SD] of 11.7 [3.5] vs 7 days enoxaparin group 9.9 [2.9]; p=0.042).

The women who had a six-week long course of enoxaparin prescribed also had a lower NCD (0.7) than the women prescribed the shorter 7-day course (1.3) (Table 2).

When the self-reported diary cards were used to group participants adherence into (1) fully adherent, or (2) with more than 1 dose missed, there were no significant differences between the groups, and only a slightly higher NCD in the fully adherent group (see table 3).

Table 3: Fully adherent and sub-optimal adherent groups' total necessity and concerns, and NCDs

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Adherence	Total Necessity Mean (SD)	Total Concerns Mean (SD)	NCD
Complete	11.6 (3)	10 (2.8)	1.6
>1 dose missed	12.9 (2)	11.6 (1.8)	1.3

Women's beliefs surrounding the AES

Table 4 outlines the perceived necessity and concerns of wearing the AES. For stockings, the NCD value was 2.7, higher than for enoxaparin. When comparing each subscale by mode of delivery, length of thromboprophylaxis and ethnicity, no significant differences found. However, the NCD of women who delivered by caesarean was higher (3) as compared to the vaginal delivery group (2.1). Similarly, the women who we asked to wear stockings for 7 days appeared to have a higher necessity-concerns differential (2.9), compared to those who were asked to wear them for 6 weeks (2), mirroring what was found with enoxaparin.

Table 4: BMQ results of AES

Subscale	Mean (SD)	VD Mean (SD)	CS Mean (SD)	7-days of AES	6-week of AES
Total Necessity	12.3 (3.9)	11.6 (3.5)	12.6 (4.1)	12 (4)	13 (3.7)
Total Concerns	9.6 (3.3)	9.5 (3.3)	9.6 (3.2)	9.1 (3.1)	11 (3.5)
Necessity/Concerns Differential	2.7	2.1	3	2.9	2

Means and standard deviations (SD) for each subscale, and by mode of delivery (VD- vaginal delivery; CS- caesarean section), and length of mechanical thromboprophylaxis prescribed

Women's experiences of wearing AES following childbirth

Questionnaire 2 explored participants views and experiences of AES and to their beliefs in relation to the impact a DVT or PE might have on their health.

The first section of the questionnaire enquired as to the adherence to wearing the stockings, with only 30% of respondents wearing the AES as directed on a daily basis, 18% wearing them most days, 27% wearing them less than instructed and a quarter of respondents not wearing them at all after discharge.

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The second section explored the reasons why participants may have worn the stockings other than as instructed. Table 5 gives percentages agreement of responses.

Most of the participants indicated that they knew the function of the AES. In terms of adverse experiences, 40.9% agreed indicating *agree* or *strongly agree* that the AES felt as though they were *cutting off the circulation in their legs*, 53% felt they were *too hot*, 37.2% agreed they did not look nice and 35.6% found them *itchy*. Only 20% agreed that the AES made their *legs sore*, with just 4.7% experiencing a rash, and 23.3% agreed that they were difficult to put on. Over 66% felt that as they were active and mobile they did not need to wear the stockings.

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Table 5: Participants reasons for not wearing AES

Statement	**% Agreement n=45**
I was active and mobile and therefore did not need them	66.7
I found the stockings too '*hot'* to wear	53.4
The stockings felt as though they were cutting off the '*circulation'* in my legs	40.9
The stockings kept '*falling down*'	38.7
The stockings did not look nice	37.2
I found the stockings *'itchy'* on my skin	35.6
I was unable to put the stockings on	33.3
The stockings caused my legs to feel sore	20
The stockings were not prescribed by a doctor; therefore, I did not think it was important to wear them	7
I was not sure what the purpose of the stockings were	7
The stockings caused a rash on my skin	4.7
There is no particular reason why I did not wear the stockings	4.7

The last section of questionnaire 2 explored perceptions to the seriousness and impact of a potential DVT or PE (table 6). Almost all, 98.4% agreed that DVT, and 96.9% that PE are serious medical conditions. In relation to the impact a DVT & PE would have, 90.7% agreed that it would impact their ability to care for their baby and 87.5% agreed it would impact their daily activities.

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Table 6: Participants perceptions of DVT and PE

Statement	**% Agreement n=45**
DVT is a serious medical condition	98.4
PE is a serious medical condition	96.9
A DVT or a PE would have a negative impact on my ability to look after my baby	90.7
A DVT or a PE would have a negative impact on my ability to complete daily activities	87.5
A DVT or a PE would have a negative impact on my ability to work	83.9
A DVT or a PE would have a negative impact on my ability to engage in social activities	82.5

Women's experiences of the intermittent pneumatic compression devices

The women who delivered by caesarean section had an additional questionnaire administered. This aimed to explore their experiences using the IPCD, applied before the onset of surgery and kept on until either transfer to the postnatal ward or until the effects of the spinal anaesthesia had worn off. The median time the IPCDs were used was 311 minutes IQR (210-563).

Table 7 summarises the responses. The majority of these appeared to be positive, suggesting that the IPCD are well tolerated by this group of patients. Items such as the IPCD's *loudness* and keeping mum and baby awake were disagreed with by 73.3%, 76.6% and 93.3% respectively. They were found to be comfortable by 86.7%, with only about a third of women feeling that they restricted mobility and none of the respondents finding them painful.

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Table 7: Patients' experiences of using the IPCD

Experiences using the foot pump (IPCD) following the birth of your baby	**% Agreement n=30**
The foot pump felt comfortable when applied to my legs	86.7
If I have another baby and need to have another caesarean section, I would be prepared to apply the foot pumps again	86.7
I found the foot pumps *soothing* when applied to my legs	60
I was happy to apply the foot pumps all the time (day and night)	53.6
I preferred to use the foot pumps whilst I was in bed	46.7
The foot pumps restricted my mobility	36.3
The foot pumps were *loud*	20
The foot pumps made my legs sweat	16.7
The foot pumps kept me awake	16.6
I preferred to apply the foot pumps only during the day	15.3
I preferred to apply the foot pumps only during the night	10.7
I preferred to use the foot pumps whilst I was sitting in my chair	10
The foot pumps felt *hot* when applied to my legs	9.7
The foot pumps kept the baby awake	3.3
I found the foot pumps *painful* when applied to my legs	0

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Discussion

Our study evaluated women's beliefs, experiences and adherence to postnatal TP. We found a relatively high self-reported adherence rate to pharmacological TP (82.4%). This is in line with previously reported studies in this population group [11-12] and suggests that when women are prescribed parenteral pharmacological TP, largely, they will adhere. In Patel and colleagues study, postnatal adherence to enoxaparin was reported at 93%, where the same women had also been prescribed antenatal TP [11]. In Horden and colleagues study of women prescribed just postnatal TP [12], adherence to the full course was reported at 83%. Interestingly, when we analysed adherence by duration of prescription, the women prescribed 6 weeks of postnatal enoxaparin were less adherent at 57% compared to 86% for the 7 day course (although not statistically significant). However it must be borne in mind that our definition of non-adherence was defined as 1 or more doses missed. Therefore, the potential for missing doses was greater in the 6 week group. In our study, we did not collect reasons for why doses of enoxaparin were missed. Common reasons reported in Horden's study for omission of doses or not completing the course of TP were bruising or wound complications, forgetting, a fear or dislike of needles and feeling that the injections were not helping [12].

Our analysis of the results from the enoxaparin specific section of the BMQ suggest, that women appeared to be accepting of the need to take enoxaparin (positive necessity-concerns differential value of 1.18). We found no difference between perceived necessities and concerns in relation to mode of delivery or ethnicity. Horden and colleagues have also reported that women are highly accepting of postnatal TP [12]. In their study, 94.5% of women questioned indicated that they would accept TP in a future pregnancy.

Previously published research has concluded that women's perceptions of medicine can be augmented by pregnancy, with higher or exaggerated concerns in relation to the effect a medication may have on their baby [19]. In our study, we found that 74.7% of women agreed that whilst they were breastfeeding they place a higher priority on the impact any medicine that they may be taking will have on their baby than to beneficial effects the medicine may have on them. This suggest that the breastfeeding women may experience an *extension* of concerns held antenatally and is an important reminder to front-line staff to counsel women on the safety of LMWH when women breastfeed.

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In Patel's study [11] it was reported that compared to antenatal period, postnatal adherence dropped in a number of women and they suggest that women's routine could be upset during the immediate postnatal period, due to the early challenges of motherhood. When the returned diary cards were examined in our study, we found many women (40%), not taking their daily dose within 2 hours of the previous day, suggesting this to be a factor.

There is a scarcity of information in the literature, on the the potential effect of missed doses or delayed doses of LMWH TP has on outcomes in terms of VTE rates. In a surgical and trauma inpatient setting, Louis and colleagues [20] found that 59% of their study cohort missed at least 1 dose of LMWH. The authors reported a 4.8% DVT rate in the uninterrupted therapy group, and a 23.5% DVT rate in the interrupted therapy group ($p < 0.01$). This study was run on an inpatient population, and adherence was not primarily influenced by patient decisions, furthermore, they included asymptomatic DVTs in their event rate. However, the findings suggest non-adherence as a possible cause for TP failure. Measuring VTE rates was outside the scope of our study, although no participant developed VTE while taking part; however, lengthier follow up in future research in this area would be beneficial.

Guideline writers and those providing care for women postnatally need to consider findings such as these, as if adherence is poor for women prescribed 6 weeks of LMWH, strategies aimed at patient support should be explored, particularly as the women questioned seemed to have a good understanding of what DVT and PE is and the impact it could have on them and their abilities for providing child-care during the first few weeks post-delivery.

Bates and colleagues have completed work exploring women's values and preferences for thromboprophylaxis during pregnancy [21]. To the best of our knowledge, no similar work exists in the postnatal population. This perhaps is unsurprising, given the higher number of women who would be eligible to TP postpartum, however, given the uncertainty and debate surrounding who warrants TP [7-9], it would be interesting to illicit women's views in the postnatal setting on this. This may well help future guideline panels in the recommendations they make.

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Women's adherence and experiences of using AES

Women's adherence to AES was relatively low compared to pharmacological TP, even though many women (96%) agreed that a DVT or a PE is a serious medical condition, and 91% of women returning the questionnaire agreeing that a DVT or a PE would impact on their ability to care for their infant. One-third of women reported not wearing the AES once at home. Interestingly, the necessity-concerns differential for AES was 2.7; higher than that reported for enoxaparin. This raises questions as to why women were then so non-adherent with AES, despite a strong understanding and necessity for them. Over 50% of women reported that the stockings made them feel too hot, 41% identified with the stockings feeling too tight, and 39% had experienced them *falling down* suggesting that the sizing of the stockings patients were given may have been inappropriate. All of these factors require greater attention, before patients are discharged home. Of the 7 women prescribed 6 weeks TP with enoxaparin and AES who returned the questionnaires and diaries, only 2 reported wearing the stockings past 23 days. This may be related to a perception that they had returned to normal levels of mobility, and thus they were not required.

The reasons for non-adherence given by women resonate with the findings from Gray and Ash [22], who surveyed pregnant women's use of AES on an antenatal ward, with no advice received and discomfort, as the 2 reasons commonly cited by the 38% of women who were non-wearers. Although their setting was the antenatal setting, the discomfort reason certainly chimes with our findings. Comfort and ease of use have also been cited as important by patients asked to wear compression stockings chronically in the setting venous leg ulcers [23-24].

Recently published guidance from the National Institute for Care Excellence (NICE) suggests combined TP with LMWH plus mechanical prophylaxis, for women who have given birth or had a miscarriage or termination of pregnancy in the past 6 weeks and who are likely to be immobilised, or have significantly reduced mobility relative to their normal or anticipated mobility for 3 or more days after surgery, including caesarean section. With respect to mechanical prophylaxis, NICE suggests using IPCD as first-line treatment and if IPCD is contraindicated, to use AES. They also state, that this should continue until the woman no longer has significantly reduced mobility relative to her normal or anticipated mobility or until discharge from hospital [25]. Given the high levels of non-adherence reported by women to AES

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and the recently published NICE guidance, the role of AES should perhaps be reviewed by maternity units.

Women's experiences of the IPCD

The questionnaire regarding IPCDs suggested that they are generally well tolerated, with very few complaints of them being *loud* or *hot*, most respondents agreeing that they were comfortable and 60% agreeing that they found them *soothing*, suggesting a high degree of acceptability to women. When asked if they would use them at their next delivery if warranted, 86.7% agreed that they would. This is encouraging, although during the execution of this study, it was observed that not all staff were competent in their application and if this is representative, then maternity units should ensure this is improved. It must be remembered, that the time CS women had to apply the IPCD was short and if IPCD replace AES as a principal form of compression TP in the future, then work around their acceptability for longer periods of time is required. In Palmero and colleagues cross-sectional study of adherence to ICPD in 293 women, 21% of women were non-compliant with SCD use [26]. Reasons for this noncompliance included patient discomfort, machine malfunction and incorrect device use. Others on the other hand have also reported high levels of patient acceptance of foot pump devices as TP in the orthopaedic surgery setting [27-29].

Limitations

Our work is limited by the fact, that not all women who took part in the parent study, returned completed questionnaires. The response rate for questionnaire 1 was high and in line with other questionnaire-based studies, however, the responses rates for questionnaires 2 was lower. Our findings however resonate with previously published findings. The adherence rates and responses to questionnaires reported in our study were self-reported, so its impossible to exclude the fact that some women may have given socially acceptable answers and an over-estimation of their adherence. We also found that women's knowledge of DVT and PE was good. Its difficult to know whether this was acquired knowledge by their participation in this study or not and so a degree of mindfulness is required when interpreting the high knowledge levels reported.

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Conclusion

Our study found that women had a good understanding of what DVT and PE was and thus their adherence to LMWH postnatally was relatively good. Post discharge adherence to AES was not as good as LMWH and their specific role is questionable in this setting, particularly in light of recent NICE guidance. Front line staff working on maternity units should ensure women are given clear advice and instructions on how long and why TP should be used and the role it plays in VTE prevention. Future work should focus on the role non-adherence has on outcomes in this setting.

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Author contribution

BG recruited patients, collected and analysed the data. DS assisted with the recruitment of patients. LNR, JPP, DS and RA designed the study. JPP drafted the manuscript, which was critically reviewed by all authors.

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Supplementary online information

Supplementary table 1 Baseline characteristics of the women who took part in the larger parent study

Characteristic	Whole Cohort	Vaginal Deliveries	Caesarean Sections	P
Mean age (SD)	35.8 (5.0)	36.5 (5.4)	36 (4.8)	0.3
Mode of delivery, n (%)	-----	32 (32.3)	67 (67.7)	n/a
Median duration of labour/surgery, min (IQR)	75 (45-484)	363.5 (123-585)	54 (41-173)	0.001*
Ethnicity, n (%)				
Caucasian	64 (64.6)	19 (59.4)	20 (29.9)	
African-Caribbean	33 (33.3)	13 (40.6)	13 (67.1)	0.38
Other	2 (2.1)	0	2 (3)	
Mean BMI, kg/m^2 (SD)	29 (7.3)	31.2 (8.1)	27.9 (6.8)	0.04*
Parity, pre-delivery, n (%)				
0	33 (33.3)	5 (15.6)	28 (41.8)	
1	30 (30.3)	8 (25)	22 (32.8)	0.003*
2	23 (23.2)	10 (31.3)	13 (19.4)	
≥3	13 (13.1)	9 (28.1)	4 (6)	
Assisted conception, n (%)	11 (11.15)	3 (9.4)	8 (11.9)	0.70
Multiple pregnancy, n (%)	13 (13.1)	4 (12.5)	9 (13.4)	0.90
Pre-eclampsia, n (%)	35 (35.4)	11 (34.4)	24 (35.8)	0.89
Infection, n (%)	10 (10)	5 (15.6)	5 (7.5)	0.24
Median postpartum risk factors, n (IQR)	3 (2-4)	3 (2-3)	3 (2-4)	0.23

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Breastfeeding at T4, n (%)	75 (75.8)	28 (87.5)	47 (70.1)	0.14
Planned enoxaparin duration, n (%)				
7 days	75 (75.8)	20 (62.5)	55 (82.1)	0.045*
6 weeks	24 (24.2)	12 (37.5)	12 (17.9)	

SD, standard deviation; IQR, interquartile range; BMI, body mass index. Significance indicated (*) at the 0.05 level.

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